



polymers for microactuator applications, plastic scintillators, getters for a variety of applications and microsystems and desiccants;

That he was the recipient of R&D 100 Awards in 2001 for Polymeric Hydrogen Getters and 2005 for TEPIC: A High-Temperature and High-Strength Material for Composite Tooling;

That he has had 12 patents issued in his name covering polymeric hydrogen getters, uniformly dense polymeric bodies, a triboluminescent sensor, thionyl chloride getters, porous silicon carbide, materials for immobilized beds, ozone decomposing filters, porous sintered bodies, triboluminescent elastomeric materials and castable 3-D stationary phase for electric field driven applications and several pending; and

That his current work includes formulating and processing new rigid, water-blown polyurethane and polyisocyanurate foams for use as encapsulating materials as well as for structural supports, and that he conducted and supervised a series of concurrent tests in order to determine, evaluate and compare the catalytic activity of the following amine compounds on water blown polyisocyanurate foams:

- I. DABCO TMR-3 (Air Products Inc., proprietary acid blocked amine)
- II. DABCO TMR-30 (2,4,6-Tris(Dimethylaminomethyl)phenol)
- III. POLYCAT 8 (N,N-Dimethylcyclohexylamine)
- IV. DABCO TMR-30 + POLYCAT 8
- V. DABCO TMR-30 + DABCO 33 LV (33% triethylenediamine in dipropylene glycol)

That the catalyzing activity of compounds I through V was determined by the following procedure:

A quantity of an isocyanurate resin was added to a quantity of a surfactant in a ratio of about 8:1 and mixed. A quantity of an epoxy resin was then added to the isocyanurate/surfactant mixture in a ratio of about 3:5 and mixed. A small amount of water (~0.5 – 1%) was added to the isocyanurate/surfactant/epoxy mixture, mixed and a small

quantity (~0.5%) of the amine catalyst was added to the mixture, mixed, immediately poured into a second vessel, and allowed to stand undisturbed as the foaming reaction proceeded.

Deponent further states that his observations were terminated after the reaction ceased, at which time the results were recorded. The relative value of the speed and quality of the polymerization reaction initiated by each of the catalyst compounds when mixed with the isocyanurate/surfactant/epoxy mixture and water was indicated by a number value as follows:

1. Rapid Incomplete Reaction
2. Delayed Incomplete Reaction
3. Moderate Complete Reaction

Deponent further states that the results of said test were as hereinafter presented in **TABLE 1** below:

**TABLE 1**

TEST	CATALYST				
	I	II	III	IV	V
A	1	---	---	---	---
B	2	---	---	---	---
C	---	1	---	---	---
D	---	---	1	---	---
E	---	---	---	3	---
F	---	---	---	---	3

Deponent further states that the test data presented in **TABLE 1** demonstrates the following:

- (1) that compounds **I**, **II** and **III** all exhibited rapid reaction resulting in partial and/or inhomogeneous polymerization of the resins;
- (2) that compounds **IV** and **V** exhibited a slower reaction resulting in acceptable polymerization.

Deponent further states that while other isocyanate trimerization agents were investigated none could be found that would yield both an acceptable end product and also exhibit acceptable processing characteristics, and that with the exception of TMR-30 none of the other catalysts were stable in the presence of water.

Further deponent sayeth not.

LeRoy L. Whinnery, Jr.  
LeRoy L. Whinnery, Jr.

Signed at Livermore, California, this 12 day of May, 2006.

On \_\_\_\_\_, 200\_\_, before me, \_\_\_\_\_, a Notary Public, **LeRoy L. WHINNERY, Jr.** personally appeared before me and proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and did acknowledged to me that he executed the same in his authorized individual capacity, and that by the signature on the instrument the person, or entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

SKR Attached.  
Notary Public  
My Commission Expires:

(SEAL)

# CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of Alameda

SS.

On May 12, 2006

Date

before me,

Holly K. Dirks

Name and Title of Officer (e.g., "Jane Doe, Notary Public")

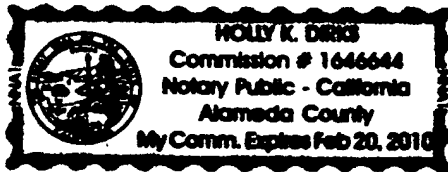
personally appeared

Leroy Louis Whinnery

Name(s) of Signer(s)

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



Place Notary Seal Above

WITNESS my hand and official seal.

Holly K. Dirks

Signature of Notary Public

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- ☐ Individual
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- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: \_\_\_\_\_

RIGHT THUMBPRINT  
OF SIGNER  
Top of thumb here

Signer Is Representing: \_\_\_\_\_

Signer's Name: \_\_\_\_\_

- ☐ Individual
- ☐ Corporate Officer — Title(s): \_\_\_\_\_
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
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